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CHEMISTRY.

No. I.

PREPARATION OF PRUSSIAN BLUE.

The Gold Isis Medal *was presented to Mr.* Lewis Thompson, *Old Barge House, Lambeth, for his method of making Prussian Blue. The following Communication has been received from Mr.* Thompson, *and a sample of the Prussian Blue has been placed in the Society's Repository.*

In the usual mode of manufacturing Prussian blue, the requisite carbon and nitrogen are obtained by decomposing animal matter in contact with potash. In this process the potash, being reduced to the metallic state, causes the formation of cyanogen, in consequence of its affinity for that substance. The quantity of nitrogen furnished by a given weight of animal matter is not large, and, in the material employed by manufacturers, seldom perhaps exceeds eight per cent; and of this small quantity at least one-half appears to be dissipated during the process, thus producing an enormous waste of material, and at the same time increasing the size of the apparatus. Reflecting on these circumstances, it occurred to me that the atmosphere might be made to supply, in a very economical manner, the requisite nitrogen, if allowed to act on a mixture of carbon and potash under favourable circumstances. The experiment proved on trial to be correct, and in some measure exceeded my expectation ; for the carbonaceous matter employed may be worked over again many times, and is even improved by each operation. I found it necessary to use iron, for a reason which will be apparent in the explanation of this process; when iron is not employed, a much higher temperature is required.

To produce Prussian blue, the following method may be adopted, but experience alone can teach us the best proportions; and in this, as in most of the arts, the caprice of each manufacturer will probably lead to the adoption of various proportions of the ingredients used.

Take of potash or pearlash	2 parts;
coke, cinders, or coals	2 parts;
iron turnings	1 part.

Grind the whole together into a coarse powder, and place it in an open crucible or other convenient vessel, and expose the whole for half an hour in an open fire to a full red heat, stirring the mass occasionally. During the process, little jets of purple flame will be observed to arise from the surface of the mixture; when these have almost ceased to appear, which will happen in about the time specified, the whole must be removed from the fire, and allowed to cool: water is now to be added, so as to dissolve the matter soluble in that fluid, and the black matter remaining put aside for another operation. The solution, after being filtered, is to be mixed with one part of copperas, and muriatic acid added in the usual way to brighten the colour of the precipitate. The quantity of Prussian blue produced from a given weight of pearlash or potash is generally about one-fourth of the weight of the pure potash contained in the salt; but the larger the quantity operated upon at one time, the larger is the relative produce. Thus six ounces of pearlash, containing 45 per cent of alkali, yielded only 295 grains of Prussian blue, whilst one pound of the same pearlash yielded 1355 grains. The Prussian blue here spoken of is the pure perferrocyanate of iron.

In this process the potash is decomposed by the iron, producing potassium, which, being volatile, rises and combines with the carbon of the coke and with the nitrogen of the atmosphere, the oxygen of which has been removed by passing through the fire, or by the coke or cinders. In the mixture, the cyanide of potassium thus formed is next dissolved in water, and furnishes ferrocyanate of iron on the addition of sulphate of iron and muriatic acid, according to the explanation given in most chemical books.

By deflagrating a mixture of nitrate of potash, coke, or small coals, and iron turnings, a mass is obtained which furnishes abundance of Prussian blue; but, in this case, the nitrogen is derived from the decomposition of the nitric acid of the nitrate of potash, for the experiment succeeds equally well in a close vessel. In these experiments, soda may be substituted for potash without affecting the result: the charcoal from most kinds of vegetables cannot, however, be employed in place of that from coals, as it is very porous, and burns away too quickly. The presence of cyanide of sodium in barilla, kelp, and English alkali, is thus easily accounted for; and the small quantity of cyanide of potassium invariably produced during the process of preparing potassium, admits of a similar explanation.

I am, Gentlemen, &c. &c.

Old Barge House,
Lambeth.

Lewis Thompson.

No. II.

PURIFICATION OF COPPER.

The Gold Medal *was presented to Mr.* Lewis Thompson, *Old Barge House, Lambeth, for his Method of purifying Copper. The following Communication has been received from him on the Subject.*

The art of manufacturing copper appears to have been known from the most remote antiquity: indeed, judging from the purity of the coins and warlike instruments which have descended to us, we might at first suppose that this, like some other of the arts formerly in use, had been partially lost, and that the ancients were better acquainted with the mode of making pure copper than we are at the present day. The great purity of their cupreous alloys is, however, much better accounted for, by attributing it to the richness of the ores then in use: for, in all probability, they were unable to extract copper from such poor pyritic ore as is now employed for that purpose, and from which English commercial copper is obtained, in a state of sufficient purity for the ordinary purposes to which copper is applied. It is always, how-